

²~~1~~ 2. The isolated DNA molecule according to claim ~~1~~², wherein the subunit has a molecular weight of 36.9 kDa.

³~~1~~ 3. The isolated DNA molecule according to claim ~~1~~³, wherein the protein has an amino acid sequence corresponding to SEQ. ID. No. 10.

~~9. The isolated DNA molecule according to claim 5, wherein the protein has an amino acid sequence corresponding to SEQ. ID. No. 10 but with mutations, deletions, or additions.~~

⁴~~1~~ 4. The isolated DNA molecule according to claim ~~1~~⁴, wherein the DNA molecule has a nucleotide sequence corresponding to SEQ. ID. No. 13.

~~11. The isolated DNA molecule according to claim 5, wherein the DNA molecule has a nucleotide sequence corresponding to SEQ. ID. No. 13 but with mutations, deletions, or additions.~~

⁵~~1~~ 5. An expression system comprising a DNA molecule, according to claim ~~1~~⁵ in a vector heterologous to the DNA molecule.

⁶~~1~~ 6. A host cell transformed with a heterologous DNA molecule according to claim ~~1~~⁶.

~~14. An isolated protein subunit of polymerase III holoenzyme, wherein the subunit group is δ' .~~

~~15. The isolated protein subunit according to claim 14, wherein the subunit stimulates DNA synthesis by the polymerase III holoenzyme.~~

⁷ 8 16. The isolated protein subunit according to claim ~~14~~, wherein the protein has a molecular weight of 36.9 kDa.

17. The isolated protein subunit according to claim 14, wherein the protein corresponds to an amino acid sequence corresponding to SEQ. ID. No. 10.

~~18. The isolated protein subunit according to claim 14, wherein the protein corresponds to an amino acid sequence corresponding to SEQ. ID. No. 10 but with mutations, deletions, or additions.~~

19. An isolated protein subunit of polymerase III holoenzyme, wherein the subunit has an amino acid sequence corresponding to amino acids residues 1-158 of SEQ. ID. No. 10 with or without mutations, deletions, or additions.

20. The isolated protein subunit according to claim 19, wherein the subunit has an amino acid sequence corresponding to amino acids residues 107-158 of SEQ. ID. No. 10 with or without mutations, deletions, or additions.

21. An isolated protein subunit of polymerase III holoenzyme, wherein the subunit group is θ .

22. The isolated protein subunit according to claim 21, wherein the protein corresponds to an amino acid sequence corresponding to SEQ. ID. No. 32.

23. The isolated protein subunit according to claim 21, wherein the protein corresponds to an amino acid sequence corresponding to SEQ. ID. No. 32, but with mutations, deletions, or additions.

24. The isolated protein subunit according to claim 21, wherein the subunit alters the 3'-5' proofreading exonuclease activity of the polymerase.

25. An isolated DNA molecule encoding a protein subunit of polymerase III holoenzyme, wherein the subunit group is θ .

26. The isolated DNA molecule according to claim 25, wherein the DNA molecule corresponds to a nucleotide sequence corresponding to SEQ. ID. No. 29.

27. The isolated DNA molecule according to claim 26, wherein the DNA molecule corresponds to a nucleotide sequence corresponding to SEQ. ID. No. 29 but with mutations, deletions, or additions.

28. The isolated DNA molecule according to claim 25, wherein the protein has an amino acid sequence corresponding to SEQ. ID. No. 32.

29. The isolated DNA molecule according to claim 25, wherein the protein has an amino acid sequence corresponding to SEQ. ID. No. 32 but with mutations, deletions, or additions.

30. An expression system comprising a DNA molecule, according to claim 25 in a vector heterologous to the DNA molecule.

31. A host cell transformed with a heterologous DNA molecule according to claim 25.

D 32. An isolated, ^{segregated} protein subunit of polymerase III holoenzyme, wherein the subunit group is ψ .

D 33. The isolated, ^{segregated} protein subunit of polymerase III holoenzyme according to claim 32, wherein the protein corresponds to an amino acid sequence corresponding to SEQ. ID. No. 38.

D 34. The isolated, ^{segregated} protein subunit of polymerase III holoenzyme according to claim 32, wherein the protein corresponds to an amino acid sequence corresponding to SEQ. ID. No. 38 but with mutations, deletions, or additions.

35. The isolated, ^{segregated} protein subunit according to claim 32, wherein the protein subunit enhances the DNA stimulated ATPase activity of a second protein subunit.

36. An isolated DNA molecule encoding a, ^{segregated} protein subunit of polymerase III holoenzyme, wherein the subunit group is ψ .

37. The isolated DNA molecule according to claim 36, wherein the DNA molecule corresponds to a nucleotide sequence corresponding to SEQ. ID. No. 39.

38. The isolated DNA molecule according to claim 36, wherein the DNA molecule corresponds to a nucleotide sequence corresponding to SEQ. ID. No. 39 but with mutations, deletions, or additions.

39. The isolated DNA molecule according to claim 36, wherein the protein has an amino acid sequence corresponding to SEQ. ID. No. 38.

40. The isolated DNA molecule according to claim 36, wherein the protein has an amino acid sequence corresponding to SEQ. ID. No. 38 but with mutations, deletions, or additions.

41. An expression system comprising a DNA molecule, according to claim 36 in a vector heterologous to the DNA molecule.

42. A host cell transformed with a heterologous DNA molecule according to claim 36.

43. An isolated protein subunit of polymerase III holoenzyme, wherein the subunit group is χ .

44. The isolated protein subunit of polymerase III holoenzyme according to claim 43, wherein the protein corresponds to an amino acid sequence corresponding to SEQ. ID. No. 53.

45. The isolated protein subunit of polymerase III holoenzyme according to claim 43, wherein the protein corresponds to an amino acid sequence corresponding to SEQ. ID. No. 53 but with mutations, deletions, or additions.

46. The isolated protein subunit according to claim 43, wherein the protein subunit enhances the DNA stimulated ATPase activity of a second protein subunit.

47. An isolated DNA molecule encoding a protein subunit of polymerase III holoenzyme, wherein the subunit group is χ .

~~48. An isolated DNA molecule according to claim~~
47, wherein the DNA molecule corresponds to a nucleotide sequence corresponding to SEQ. ID. No. 50.

49. The isolated DNA molecule according to claim 47, wherein the DNA molecule corresponds to a nucleotide sequence corresponding to SEQ. ID. No. 50 but with mutations, deletions, or additions.

50. The isolated DNA molecule according to claim 47, wherein the protein has an amino acid sequence corresponding to SEQ. ID. No. 53.

51. The isolated DNA molecule according to claim 36, wherein the protein has an amino acid sequence corresponding to SEQ. ID. No. 53 but with mutations, deletions, or additions.

52. An expression system comprising a DNA molecule, according to claim 47, in a vector heterologous to the DNA molecule.

53. A host cell transformed with a heterologous DNA molecule according to claim 47.

54. An isolated protein subunit of polymerase III holoenzyme, wherein the subunit group is δ .

55. The isolated protein subunit of polymerase III holoenzyme according to claim 54, wherein the protein corresponds to an amino acid sequence corresponding to SEQ. ID. No. 9.

56. The isolated protein subunit of polymerase III holoenzyme according to claim 54, wherein the protein

corresponds to an amino acid sequence corresponding to SEQ. ID. No. 9 but with mutations, deletions, or additions.

57. The isolated protein subunit according to claim 54, wherein the subunit stimulates DNA synthesis of the polymerase III holoenzyme

10/12 58. The isolated protein subunit according to claim 54, wherein the protein subunit enhances the DNA stimulated ATPase activity of a second protein subunit.

59. An isolated DNA molecule encoding a protein subunit of polymerase III holoenzyme, wherein the subunit group is δ .

60. The isolated DNA molecule according to claim 59, wherein the DNA molecule corresponds to a nucleotide sequence corresponding to SEQ. ID. No. 6.

61. The isolated DNA molecule according to claim 59, wherein the DNA molecule corresponds to a nucleotide sequence corresponding to SEQ. ID. No. 6 but with mutations, deletions, or additions.

13/15 62. The isolated DNA molecule according to claim 59, wherein the protein has an amino acid sequence corresponding to SEQ. ID. No. 9.

63. The isolated DNA molecule according to claim 36, wherein the protein has an amino acid sequence corresponding to SEQ. ID. No. 9 but with mutations, deletions, or additions.

~~16~~ ~~64.~~ An expression system comprising a DNA molecule, according to claim ~~59~~ ^B in a vector heterologous to the DNA molecule.

~~17~~ ~~65.~~ A host cell transformed with a heterologous DNA molecule according to claim ~~59~~ ^B.

66. An isolated first protein subunit of polymerase III holoenzyme, wherein the first subunit is homologous to a second subunit of polymerase III holoenzyme.

67. The isolated protein subunit according to claim 66, wherein the first subunit is δ' .

68. The isolated first protein subunit according to claim 67, wherein the second subunit is τ or γ .

69. The isolated first protein subunit according to claim 68, wherein the first subunit and the second subunit have at least 27% identity.

70. The isolated first protein subunit according to claim 69, wherein a portion of the first protein subunit and a portion of the second protein subunit have at least 49% identity.

71. An isolated first protein subunit of polymerase III holoenzyme, wherein the first protein subunit physically interacts with a second protein subunit.

72. The isolated first protein subunit according to claim 71, wherein the first subunit is δ' and the second subunit is δ .